

NEVADA BUREAU OF MINES AND GEOLOGY

NEVADA MINERAL AND ENERGY RESOURCE EXPLORATION SURVEY

2019/2020

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University of Nevada, Reno



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EXPLORATION SURVEY ES-2020**

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AND ENERGY RESOURCE
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EXECUTIVE SUMMARY

The Nevada Bureau of Mines and Geology (NBMG) carried out its biennial online survey of companies exploring for new metal, industrial mineral, geothermal, and hydrocarbon resources in Nevada. The Nevada Commission on Mineral Resources and the Nevada Division of Minerals supported the survey. The impact of mineral and energy production on the Nevada economy is well known. However, the impacts of exploration activities in Nevada, which focus on discovering new resources for future mines and energy extraction, is poorly understood due to limited data. A goal of the survey was to gather data to better assess the impact of exploration on Nevada's economy. The survey's focus was to collect data on company expenditures in Nevada and the number of employees involved in exploration in 2019, as well as projections for 2020. The survey also requested companies to break down their expenditures by category, as well as to rate the relative impact of various factors on their exploration programs. NBMG initially requested surveys from 299 companies, of which 186 explore for precious metals (gold and silver), 7 for base metals (mainly copper), 43 for energy metals (mainly lithium), 29 for industrial minerals, 10 for geothermal energy, and 18 for oil and gas. Of those companies, 52 completed the survey, for a response rate of 17%. Additionally, NBMG researched company websites to gather expenditure data for 19 companies that did not respond to the survey. The results shown presented in the report are only for the 52 companies that completed the survey and the 19 companies we researched for expenditure data.

The results regarding expenditures and number of employees showed:

- A minimum of \$260,605,645 was spent on exploration in Nevada in 2019. Exploration for precious metals accounted for 63% of the expenditures.
- Projected expenditures for 2020 were at least \$398,700,719.
- Companies directly employed a minimum of 599 people in 2019 to carry out exploration in Nevada. The number of employees in 2020 was projected to increase by 18.9% to 712.

The breakdown of the 2019 expenditures shows:

- 41% of the expenditures on actual exploration (mainly drilling), 39% on land (e.g., claim fees, lease payments), 11% on corporate overhead costs, and 8% on permitting costs.
- 32% of the expenditures on exploration aimed at expanding existing mines, fields, or resources. The remaining 68% was spent on grassroots exploration away from existing operations or resources. On a cumulative cash basis, respondents indicated 58% of their 2019 exploration expenditures went toward research expansions and 42% went toward grassroots exploration.

Responses to factors that impact exploration show:

- Nevada's favorable geology, access to public lands, and potential for new discoveries are the most important factors that attract companies to explore in Nevada.
- The time and cost of permitting, claim fees and cost of leases, and uncertainty over U.S. Mining Law reform are the most negative impacting factors.

INTRODUCTION

During December, 2020 and January, 2021, the Nevada Bureau of Mines and Geology (NBMG) conducted the 21st “Nevada Exploration Survey” of companies engaged in exploration projects. As in previous years, the purpose of this survey was to assess the current and projected levels of exploration activity and to determine factors influencing these levels. The rationale for doing this survey is to provide information to elected officials, government agencies, private companies, and citizens in general, so they better understand the impact of exploration on the Nevada economy and the factors that influence exploration. NBMG first carried out the Nevada exploration survey in 2011 (Muntean et al., 2013), and since has done the survey on a biennial basis, in 2015/2016 (Ressel and Davis, 2017) and in 2017/2018 (Ressel, 2019).

The first 17 surveys were conducted by the Nevada Division of Minerals (NDOM) on an annual basis. In 2011 the Nevada Commission on Mineral Resources and NDOM supported NBMG to conduct the survey. They charged NBMG with increasing the population size and the response rate of the survey. In addition to companies exploring for metals and industrial minerals, NBMG was asked to send the survey to companies exploring for geothermal energy and oil and gas. The survey form was simplified to emphasize the amount of money companies spent on exploration, and the number of people companies employed in exploration.

SURVEY METHODOLOGY

The survey form (Appendix) requested information on: (1) company exploration expenditures in Nevada, both estimated 2019 expenditures and projected expenditures for 2020; (2) the number of people they directly employed in Nevada exploration, both the estimated number in 2019 and the projected number in 2020; (3) an estimated percentage breakdown of the 2019 expenditures by category, including actual exploration (e.g., drilling, geology, geochemistry, geophysics), land holding costs, permitting and compliance, and corporate costs; (4) the percentage of expenditures dedicated to mine expansion versus grassroots efforts; and (5) the relative impact of factors that affect exploration in Nevada, including geology, potential for new discoveries, commodity prices, access to land to explore, land holding costs, time and cost of permitting, and uncertainty over U.S. mining laws.

NBMG initially contacted 299 companies, of which 186 explore for precious metals (gold and silver), 7 for base metals (mainly copper), 43 for energy metals (mainly lithium), 29 for industrial minerals, 10 for geothermal energy, and 18 for oil and gas. Of those companies, 52 completed the survey, for a total response rate of 17%. Of those that responded, 45 were precious metal companies, 4 were base metal companies, 2 were energy metals companies, 2 were geothermal companies, and 1 was a hydrocarbon exploration company. There were no responses from industrial mineral companies. Additionally, NBMG researched company websites to gather expenditures data for 19 companies that did not respond to the survey. We therefore effectively collected expenditures data from 71 different companies, of which 55 were exploring for precious metals, 4 for base metals, 9 for energy metals, 2 for geothermal energy, and 1 for oil and gas. The estimated 2019 expenditures discussed in the following section are a combination of expenditures listed in the survey responses and those researched online.

2019 EXPENDITURES

The 2019 expenditures on Nevada exploration totaled \$260,605,645. This is a minimum estimate and is based on the expenditure data of the 71 companies detailed above. It totals to a mean of \$3.67 million per company. The median of the 2019 expenditure data was \$500,000. Figure 1 shows that three industry sectors account for nearly all expenditures, with 63% of expenditures for the exploration of precious metals, 21% for the exploration of base metals, and 16% for the exploration of energy metals (mainly lithium, vanadium, and cobalt). Expenditures on exploration for geothermal energy and hydrocarbons did occur; however, very little exploration expenditure data from geothermal

and oil and gas companies were obtained, as well as exploration expenditures data from industrial mineral companies, despite attempts to contact geothermal companies and searching for expenditures data online. Many of the companies are not public companies, and, therefore, do not post their financial data on their websites. Figure 2 summarizes the expenditures by industry sector in a stacked histogram.

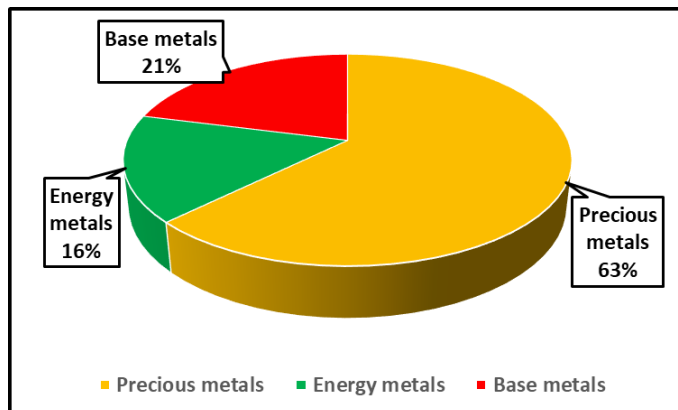


Figure 1. Pie chart showing the proportion of the three exploration sectors that accounted for almost all of the 2019 exploration expenditures based on the survey responses. There was also exploration spending for geothermal energy, industrial minerals, and oil and gas, but there were insufficient or no survey responses to include in this chart.

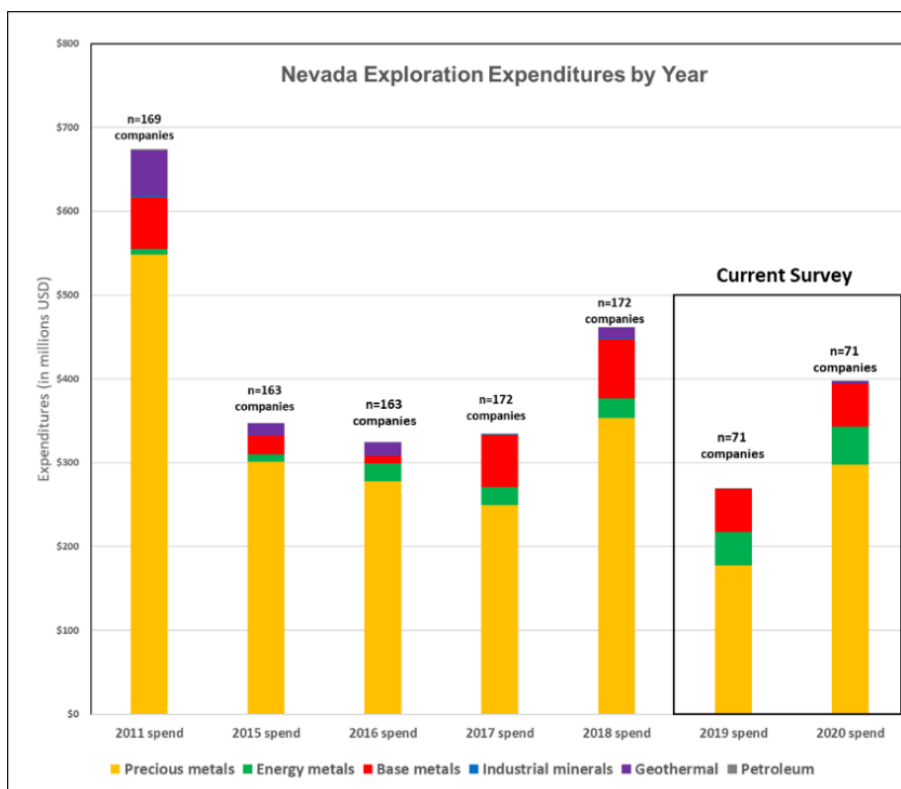


Figure 2. Stacked histogram chart showing minimum Nevada exploration expenditures in 2011, and 2015 through projected expenditures in 2020, by industry sector.

BREAK DOWN OF 2019 EXPLORATION EXPENDITURES

The survey asked companies to break down their 2019 expenditures into percentages of the following categories: (1) actual exploration expenditures, (2) land holding costs, (3) permitting costs, and (4) corporate overhead costs. Figure 3 shows the breakdown of spending. Exploration and landholding costs (e.g., lease payments, annual claim fees) account for 80% of the total expenditures, whereas corporate overhead and permitting costs account for less than 20%. Corporate overhead is relatively low because most of the companies doing exploration are junior companies.

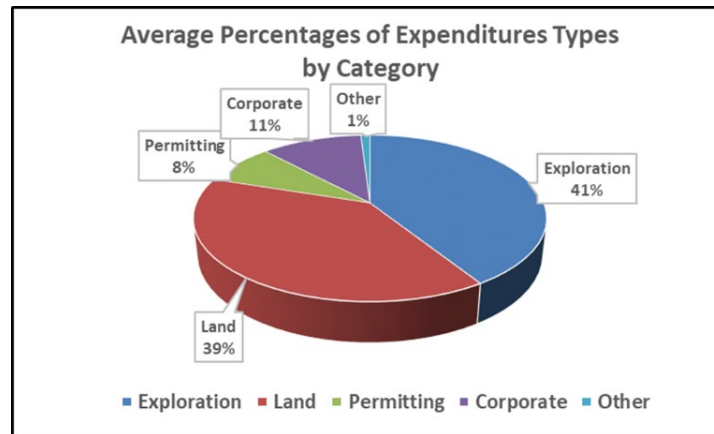


Figure 3. Pie chart showing relative percentages of 2019 exploration expenditures on actual exploration, land payments (e.g., lease payments, annual claim fees), corporate overhead, and permitting costs, based on 42 survey responses.

EXPENDITURES ON RESOURCE EXPANSION VERSUS GRASSROOTS EXPLORATION IN 2019

The survey also requested companies to estimate the percentage of their exploration expenditures for resource expansion versus grassroots exploration. Based on 34 responses, the average percentage was 32% on resource expansion and 68% on grassroots exploration in 2019, as shown in Figure 4. When the estimated percentages are multiplied against the total exploration expenditures, \$39,559,644 was spent on resource expansion exploration and \$27,915,034 was spent on grassroots exploration. Therefore, from an expenditure point a view, 58% of the exploration expenditures were spent on resource expansion and 42% on grassroots exploration. Figure 5 is a graph of total 2019 expenditures versus the percentage of expenditures spent on grassroots exploration based on responses from the 34 companies. It shows a crude negative correlation, which is likely related to much lower drilling costs in grassroots exploration in comparison to resource expansion drilling that typically is drilling intensive.

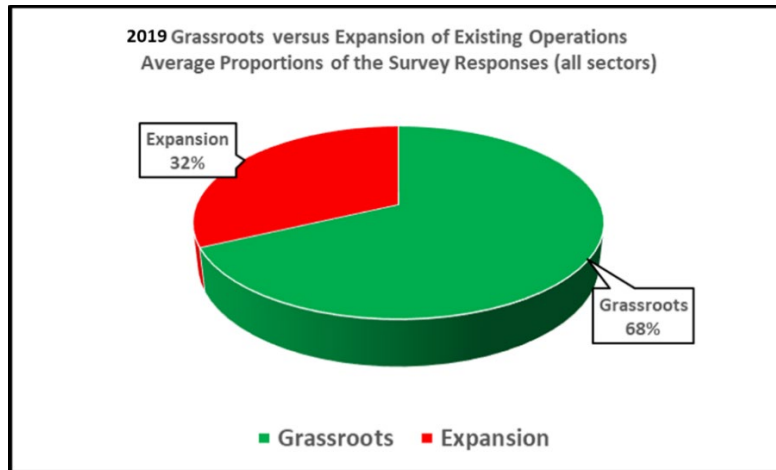


Figure 4. Pie chart showing relative percentages of expenditures for resource expansion versus grassroots exploration based on survey responses from 34 companies.

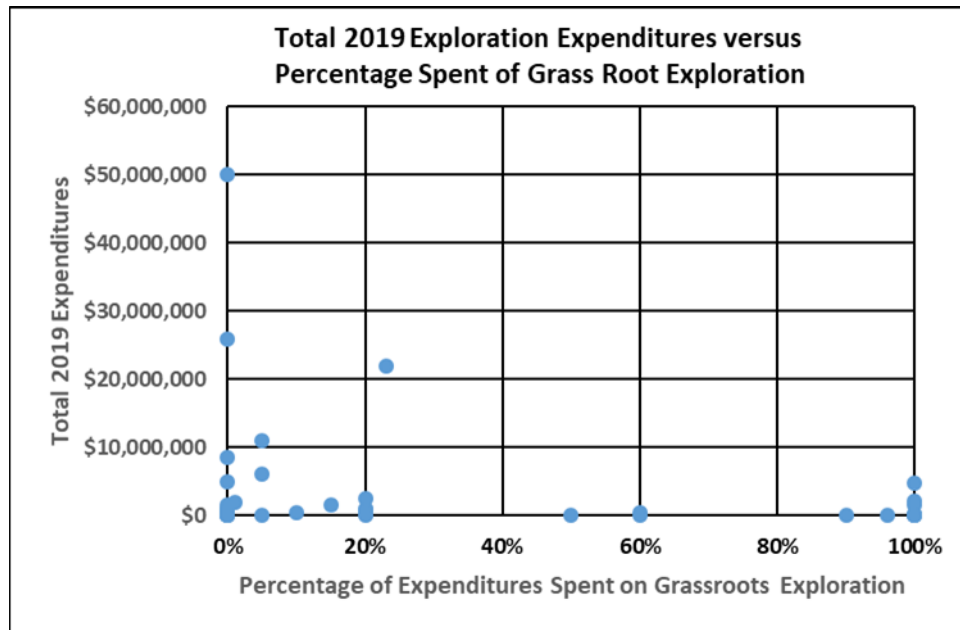


Figure 5. Graph of total 2019 exploration expenditures versus the percentage of expenditures for grassroots exploration based on survey responses of 34 companies.

PROJECTED 2020 EXPENDITURES

Expenditures projected in 2020 for Nevada were \$398,700,719, based on the survey responses from 51 companies and internet research for 14 additional companies. This is a projected increase of 47% from the 2019 expenditures. Of the survey respondents, 71% projected exploration expenses would increase in 2020, as shown in the pie chart in figure 6. The histogram in figure 2 summarizes the exploration expenditures by industry sector in 2011, and 2015 through the projected expenses for 2020.

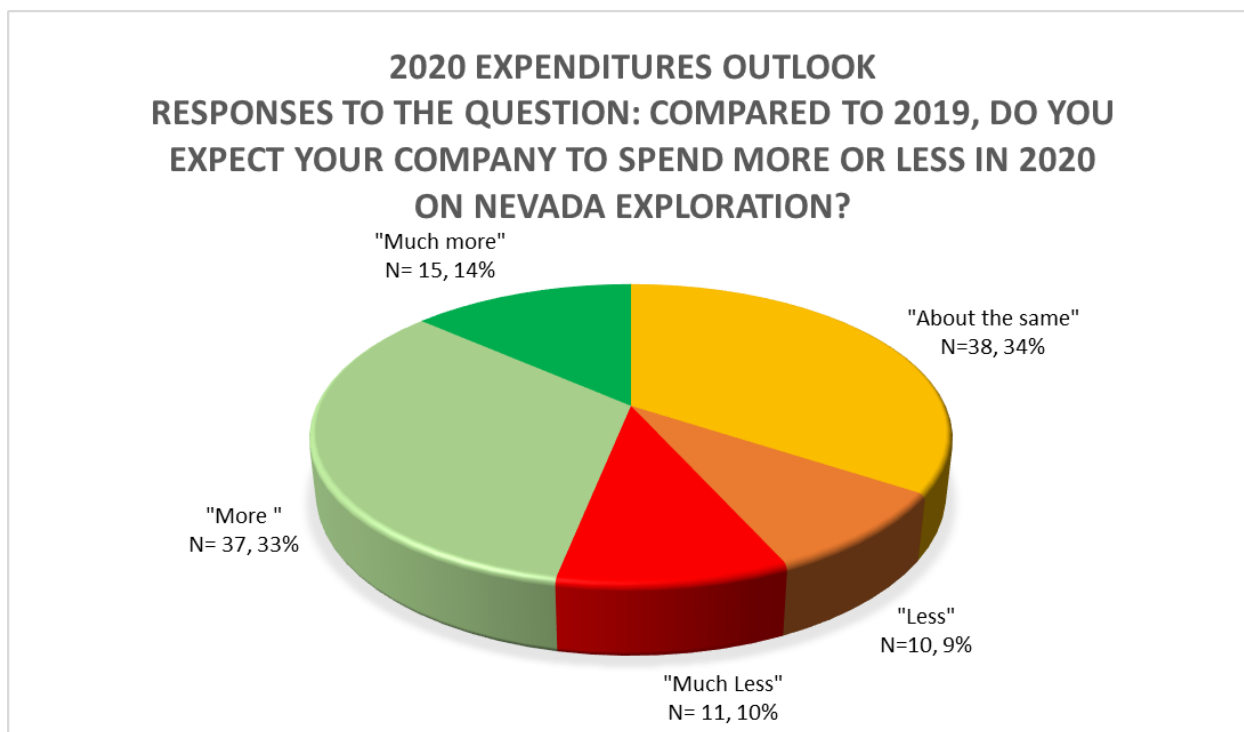


Figure 6. Pie chart showing the outlook for 2021 exploration expenditures based on 51 survey responses and internet research on 14 companies.

2019 AND PROJECTED 2020 EXPLORATION EMPLOYMENT

Based on survey responses from 51 companies, a minimum of 599 people were directly employed in exploration in 2019. Of the 599, 94% were employed in precious metal exploration. This percentage is certainly higher than the actual percentage given the lack of responses from geothermal, oil and gas, and industrial minerals companies. Based on survey responses from the same 51 companies, exploration employment was projected to increase to 712 in 2020, an increase of 18.9% from 2019, the vast of majority of which will be employed by companies exploring for precious metals. The histogram in figure 7 shows the exploration employment numbers by industry sector from 2011 through the projections for 2020. Figure 8 shows the number of employees involved in exploration by size of company. The majority of companies doing exploration in Nevada had less than 5 employees involved in exploration. Many of these companies are junior exploration companies that do not have operating mines in Nevada. Figure 9 shows a crude relationship between the exploration expenditures in 2019 and the number of employees involved in exploration in 2019. Note there is only one company with greater than 100 employees involved in exploration.

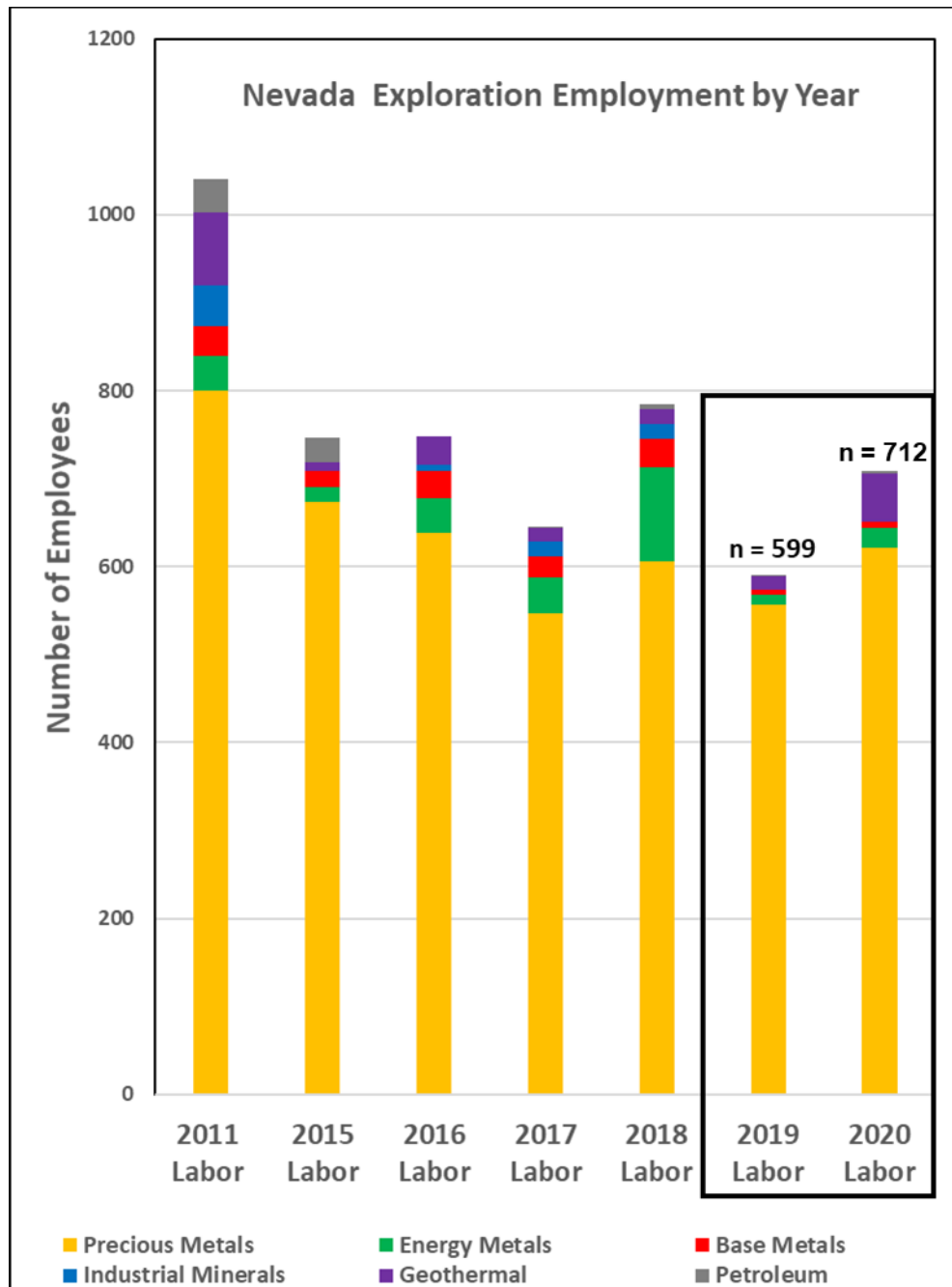


Figure 7. Stacked histogram chart showing minimum number of people employed in Nevada exploration in 2011 and 2015 through projected 2020 employment by industry sector.

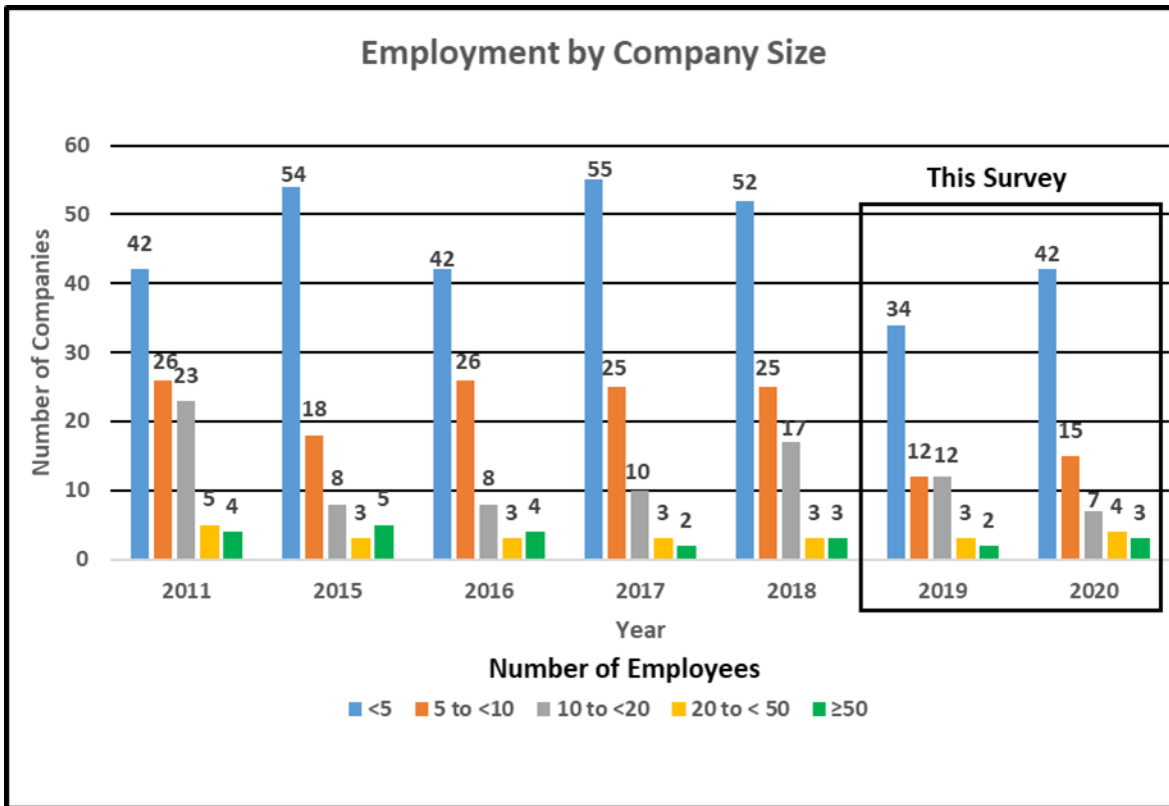
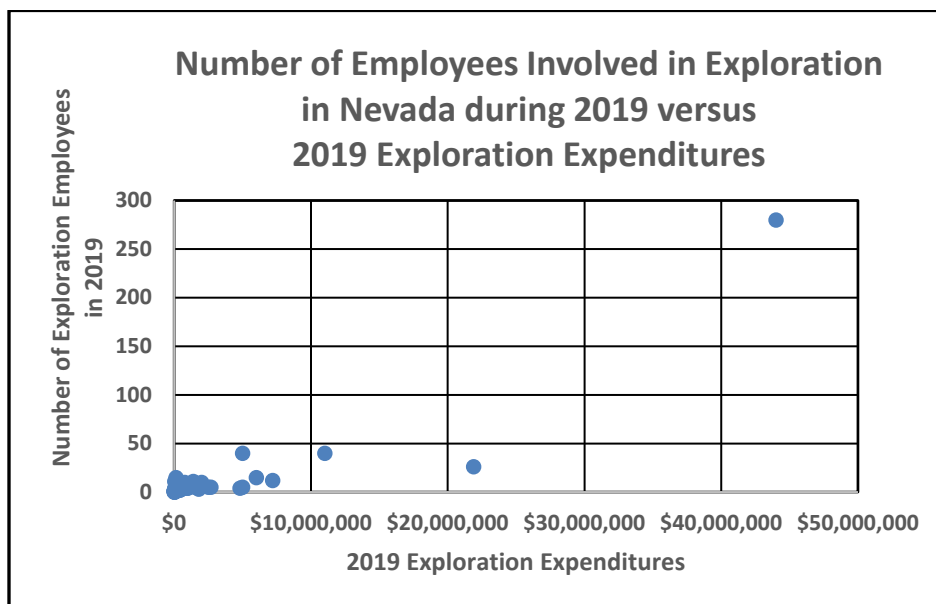


Figure 8. Histogram showing employment by company size from 2011 and 2015 through projected employment in 2020. Note most companies only had less than 5 employees involved in exploration. Only a few companies had more than 50 employees involved in exploration.



FACTORS THAT IMPACT EXPLORATION

The survey asked companies to rate, on a scale from 1 to 5, how seven factors impact their exploration. The averages for the 59 companies that responded were 4.78 for favorable geology in Nevada, 4.48 for the potential for new discoveries in Nevada, 3.85 for current or projected commodity prices, 4.42 for access to public lands in Nevada, 3.32 for mining claim or lease fees on public lands, 3.48 for the time and cost required to permit in Nevada, and 3.05 for uncertainty over possible reforms to U.S. mining laws (fig. 10). High ratings can mean either a positive impact or negative impact, depending on the type of factor. In future surveys, NBMG will use a rating scale utilizing both positive and negative ratings, where negative ratings indicate the factor negatively impacts exploration and positive ratings indicate the factor positively impacts exploration. Clearly, Nevada geology, with its huge endowment of gold deposits, and access to vast federally managed public lands continue to be important factors in attracting companies to explore in Nevada. The time and cost of permitting is the largest negative impacting factor, more so than claim fees or uncertainty over U.S. Mining Law reform. Based on the Fraser Institute's Annual International Survey of Mining Companies in 2020, Nevada was ranked as the top jurisdiction for mineral exploration in the world, moving up from its third-place ranking in 2019.

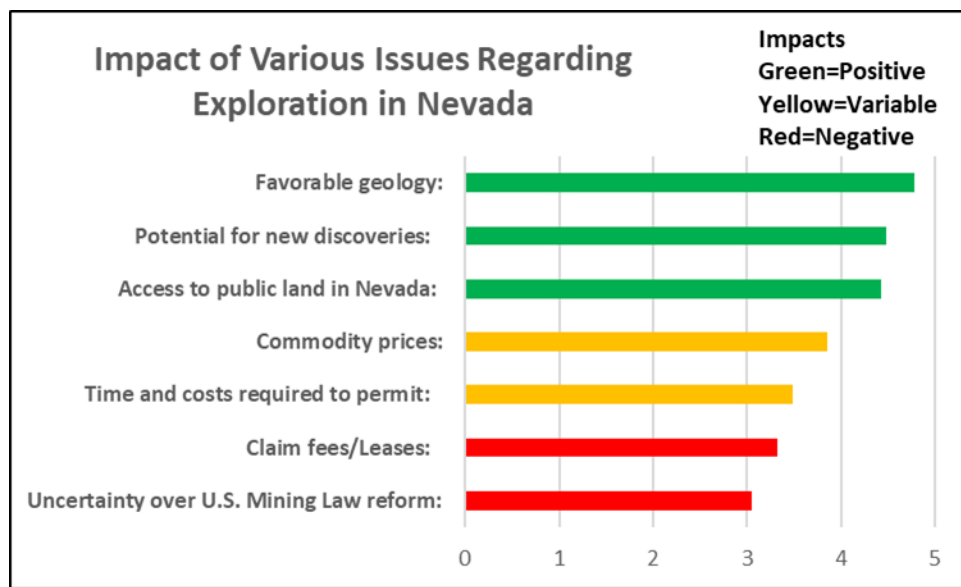


Figure 10. Graph showing factors that impact exploration for minerals and energy in Nevada. A score of 5 represents the highest impact and a score of 1 represents the lowest impact. Factors in green are considered to have a positive impact. Factors in yellow can have variable impacts, both positive and negative. Factors in red are considered to have a negative impact. Results are based on 59 survey responses.

ACKNOWLEDGMENTS

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Suggested Citation:

Muntean, J.L., 2021, Nevada mineral and energy resource exploration survey 2019/2020: Nevada Bureau of Mines and Geology Exploration Survey ES-2021, 14 p.

REFERENCES

- Muntean, J.L., Garside, L.J., and Davis, D.A., 2013, Nevada mineral and energy resource exploration survey 2011: Nevada Bureau of Mines and Geology Exploration Survey ES-2011, 22 p.
- Ressel, M.W., and Davis, D.A., 2017, Nevada mineral and energy resource exploration survey 2015/2016: Nevada Bureau of Mines and Geology Exploration Survey ES-2016, 19 p.
- Ressel, M.W., 2019, Nevada mineral and energy resource exploration survey 2017/2018: Nevada Bureau of Mines and Geology Exploration Survey ES-2018, 19 p.

APPENDIX
Nevada Division of Minerals
Nevada Bureau of Mines and Geology
2021 Minerals Exploration Survey
with 2019/2020 Data

Company Name: _____
Contact Person: _____
Email: _____ **Phone:** _____

The first two questions are critical. Please answer the rest if you can.

1. What were your company's exploration expenditures in Nevada in 2019 and in 2020?

2019 exploration expenditures in Nevada: \$ _____

2020 exploration expenditures in Nevada: \$ _____

2. How many people did your company employ in exploration in Nevada in 2019 and in 2020? Include geologists and support staff, both company employees and individual contractors and consultants.

2019 number of employees involved in Nevada exploration: _____

2020 number of employees involved in Nevada exploration: _____

3. If you can, please ESTIMATE the percentage of your company's total Nevada expenditures in 2019 that went toward the following categories, including salaries and benefits.

Actual exploration (drilling, geology, geochemistry, geophysics, etc.): _____ %

Land holding costs (claims staking and maintenance, lease payments, etc.): _____ %

Permitting and compliance (environmental studies, bonding, reclamation, etc.): _____ %

Corporate costs (overhead, legal, taxes, etc.): _____ %

Other (please specify _____): _____ %

4. Please ESTIMATE the percentage of your Nevada 2020 exploration expenditures dedicated to expansion around existing operations and to grassroots efforts.

Expansions: _____ %

Grassroots exploration: _____ %

5. Pertaining to Nevada, please rate how the following factors impact your exploration activity, with 1 being insignificant and 5 being very significant.

Favorable geology:	1	2	3	4	5
Potential for new discoveries:	1	2	3	4	5
Commodity prices:	1	2	3	4	5
Access to public land in Nevada:	1	2	3	4	5
Claim/lease fees:	1	2	3	4	5
Time and costs required to permit:	1	2	3	4	5
Uncertainty over U.S. Mining Law reform:	1	2	3	4	5
Other (please specify): _____	1	2	3	4	5

6. Which, if any, of the factors in item 5 above negatively impact Nevada's attractiveness for exploration relative to other regions in which your company explores?

7. Compared to 2019, do you expect your company to spend more or less in 2020 on Nevada exploration?

Much more More About the same Less Much Less

Thank you. All individual responses will be held confidential.

Questions or comments? Please call John Muntean at (775) 682-8748, or e-mail to: munteanj@unr.edu